

## CLAIMS

037 What is claimed is:

1. A method for maintaining a desired flue parameter level of a multiburner furnace within a predetermined range of sequential values having an upper limit and a lower limit so as to produce and deliver appropriate oxidants to the combustants at the burners to increase efficiency and decrease pollution, the method being adapted for use with an Automatic Furnace, including an electronic control unit (ECU) having memory, a multiburner furnace, a flue parameter sensor, an oxidant delivery system controlled by the ECU for delivering selected oxidant doses to the combustants at the burners producing oxidant doses at the burners and sequential flue parameter doses in the flue, the Automatic Furnace having a plurality of oxidant and sequential flue parameter doses ranging from a first dose to a second dose, the method comprising:  
delivering the second oxidant dose to the burners and the second flue parameter dose to the flue, while repeatedly sequencing through the plurality of sequential flue parameter doses beginning with the first dose and proceeding to an adjacent dose in the sequence after a predetermined time interval has elapsed until the flue parameter level

of the Automatic Furnace attains the desired flue parameter level at which point a corresponding oxidant dosage and flue parameter dose are selected from the plurality of sequential oxidant and flue parameter doses; delivering the selected oxidant and flue parameter doses so as to maintain the flue parameter level in its desired range.

2. The method of claim 1 wherein CO is the flue parameter.

3. The method of Claim 1 wherein the current circulation time is determined by:

means for storing a predetermined number of base state values in memory; and

means for determining a predetermined sequence of base state levels.

4. The method of claim 1 wherein the reaction time is determined by logic flow charts.

5. The method of Claim 1 wherein temperature is the flue parameter.

6. The method of Claim 1 wherein NO is the flue parameter.

7. The method of Claim 1 wherein compressed gaseous air is the oxidant.
8. The method of Claim 1 wherein compressed oxygen gas is the oxidant.
9. The method of Claim 1 wherein the combustant is solid, liquid, or gas.
- 10 . The method of Claim 1 wherein the combustant is a hydrocarbon.
11. A method for maintaining a desired flue parameter level of a multiburner furnace within a predetermined range of sequential values having an upper limit and a lower limit so as to produce and deliver appropriate oxidants to the combustants at the burners to increase efficiency and decrease pollution, the method being adapted for use with an Automatic Furnace, including an electronic control unit (ECU) having memory, a multiburner furnace, a flue parameter sensor, an oxidant delivery system controlled by the ECU for delivering a selected oxidant dose to the combustants at the burners, the oxidant delivery system having a plurality of sequential oxidant and flue parameter doses ranging from a first dose to a second dose, the method comprising:

delivering the second oxidant dose to the burners, while sequencing through the plurality of sequential oxidant doses beginning with the first oxidant dose and proceeding to an adjacent oxidant dose in the sequence after a predetermined time interval has elapsed until the flue parameter level of the Automatic Furnace attains the desired flue parameter level at which point a corresponding oxidant dosage is selected from the plurality of sequential oxidant doses.

delivering the selected oxidant dose so as to maintain the flue parameter level in its desired range.

12. The method of claim 11 wherein CO is the flue parameter.

13. The method of Claim 11 wherein the current circulation time is determined by:

means for storing a predetermined number of base state values in memory;

and

means for determining a predetermined sequence of base state levels.

14. The method of claim 11 wherein the reaction time is determined by logic flow charts.

15. The method of Claim 11 wherein temperature is the flue parameter.

16. The method of Claim 11 wherein NO is the flue parameter.

17. The method of Claim 11 wherein the oxidant is compressed gaseous air.

18. The method of Claim 11 wherein the oxidant is compressed oxygen gas.

19. The method of Claim 11 wherein the combustants are solid, liquid, or gas.

20. The method of Claim 11 wherein the combustants are hydrocarbons.